

## Appendix A: **Concentrating Solar Power**

The outlook for the cost and technical feasibility of solar power and distributed generation in general are very good. Concentrating Solar Power ("CSP") plants, which use giant mirrors to concentrate solar heat to generate steam to run a turbine (generator) could be developed near Santa Fe. A single five acre CSP plant can provide enough power for 1000 homes (on a 24 hour basis). These plants can also store their energy for nighttime and cloudy periods, and can utilize natural gas, diesel, or biodiesel as back up heat source so as to achieve 100% reliable output but with extremely low emissions (because 75% or more of the energy would be coming from solar). If a biofuel is used, the plants would be 100% renewable.

CSP technology was first tested successfully by the DOE and industry partners in the 1980s (plants which are still running today), but US utilities have simply did not choose to develop the technology further, and opposition from conventional energy industries prevented further federal support. The DOE, however, finally commissioned a study in 2002 called "Assessment of Parabolic Trough and Power Tower Solar Technology Cost and Performance Forecasts", which showed that these technologies could reach cost competitive levels if one a few thousand megawatts were developed (a few power plants worth). Since then, new CSP projects have started to emerge in California, Nevada, Arizona, and in other countries such as Spain. Several major companies are now providing CSP and are actively courting New Mexico. In response, New Mexico now offers a strong suite of tax incentives for CSP development. If Santa Fe were to proactively seek to locate its own CSP project in the region, it could likely team up with other communities interested in CSP, such as Los Alamos, Gallup, Las Cruces, and others, and build a series of such locally-sited plants in a coordinated fashion (thereby lowering the costs dramatically).

The cost outlook for photovoltaics is also very promising: The costs have already fallen orders of magnitude since the 1970s, and the cost reduction continues to follow a predictable "power law" curve based on volume of production. The industry has also been growing at a phenomenal 31% exponential growth rate over the past ten years. When this growth rate is combined with the power law cost reduction curve, one obtains a prediction that on-site PV generation will be directly competitive with conventional retail power delivered over the grid by about 2016, which is just around the corner in terms of the time it takes to develop new conventional power plants.

The cost of other distributed generation approaches such as microturbine-cogeneration systems and large diesel-fired (and bio-diesel fired) generators is also promising. In particular, the former use natural gas so efficiently, and the latter, although tending to cost more than the wholesale cost of conventional

power, can be located close to urban centers such that costs of new transmission can be avoided.